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FEDERAL-STATE COOPERATIVE SNOW SURVEYS and IRRIGATION WATER FORECASTS

FOR RIO GRANDE DRAINAGE BASIN

March 1, 1948



by
Division of Irrigation and Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Works included in this report were prepared by the Irrigation and Conservation Service, U.S. Department of Agriculture, in cooperation with the U.S. Forest Service, National Park Service, State Engineers of Colorado and New Mexico, and other Federal, State and local organizations.

MARCH 1, 1949

Water Supply Outlook

Rio Grande and Canadian River Drainage Basins

The water supply outlook for irrigated areas served by the Rio Grande and its tributaries in San Luis Valley is well above normal for March 1. Snow accumulation during February was about average but previous snow has brought the snow water content on most courses to the highest March 1 value since snow survey started in 1937. Along the Sangre de Cristo range to the east of the Valley snow cover is near normal. Recent precipitation in the valley areas has been deficient and the soil is dry. On the headwaters of the Pecos and Canadian Rivers the snow cover is slightly above normal and less than for March 1, 1948.

RIO GRANDE

Snow accumulation along the Continental Divide to the west of San Luis Valley is very high and generally greater than for any March 1 surveys since snow surveys were started in 1937. Current snow water contents average slightly higher than for March 1, 1941, the previous maximum. A heavy summer runoff may be expected on the Upper Rio Grande, Alamosa, and Conejos Rivers but the rate and total volume will depend on later snow accumulation, and temperatures at melting time. Snow is unusually heavy at elevations between 9000 and 9500 feet. February snowfall was normal or less. On the Sangre de Cristo range to the east of the valley snow cover is slightly above normal and less than a year ago. Little snow is reported on the valley floor and the soil is dry.

Snow conditions on the headwaters of the Rio Chama, especially along the Continental Divide are well above normal. On other Rio Grande tributaries, east of the river in New Mexico, snow cover is about normal. Soil moisture conditions are reported as good at higher elevations but precipitation has been light and the soil is dry in the Middle Rio Grande near Albuquerque. Storage in El Vado Reservoir is now 101,000 acre-feet as compared to 147,000 a month ago.

The combined storage in Elephant Butte and Caballo Reservoirs is now 669,000 acre-feet. On March 1, 1948 it was 575,000. Recent precipitation in the Lower Rio Grande Valley has been light but soil moisture is reported as good and stream flow as normal.

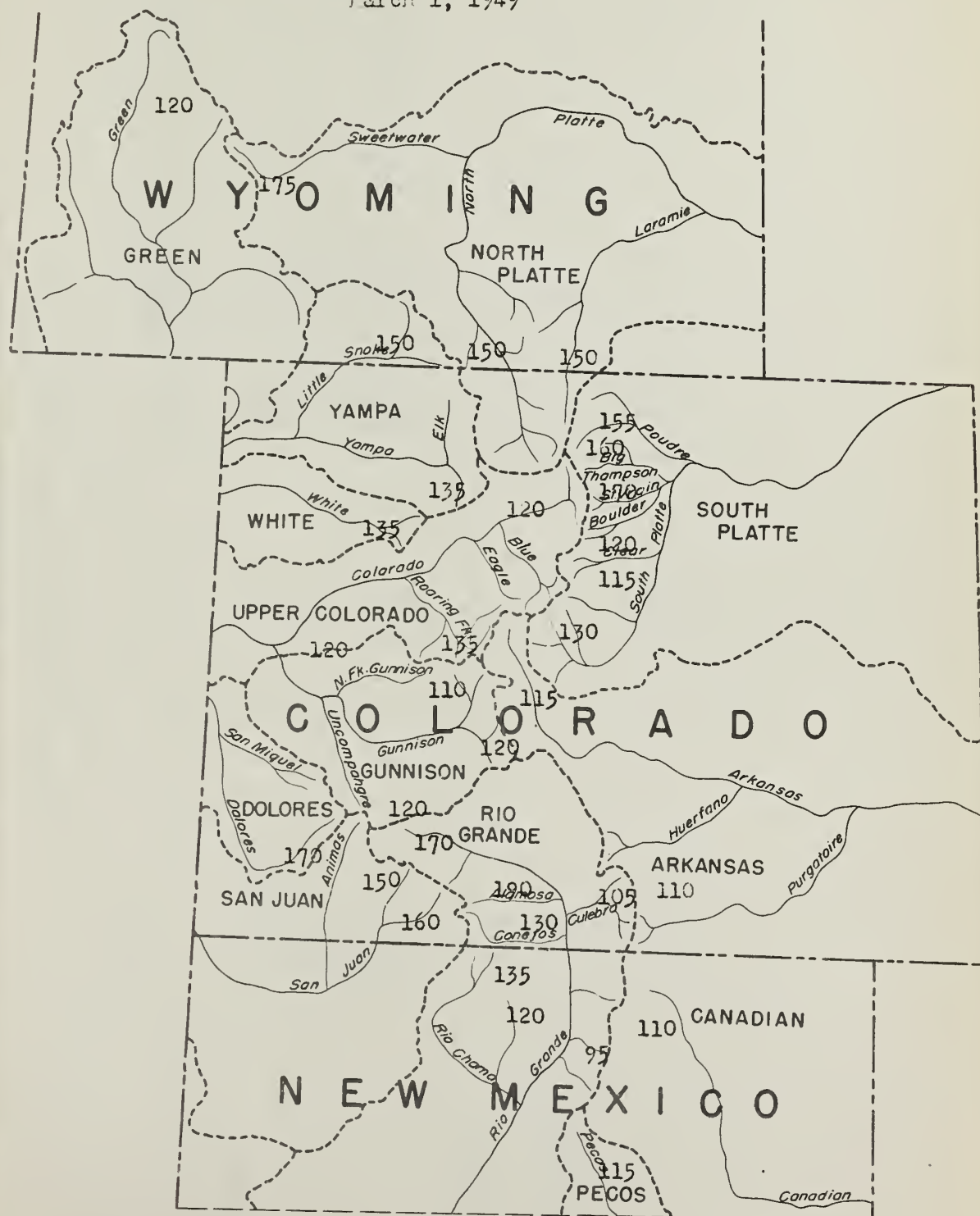
On the headwaters of the Pecos River near Santa Fe snow cover is slightly above average and less than a year ago. Storage in Alamogordo, McMillan and Avalon Reservoirs is now 37,000 acre-feet, about the same as last year at this time. Soil moisture in the Carlsbad area is reported as good due to mid-winter snow.

CANADIAN RIVER

On the tributaries of the Canadian River the snow water content is ten percent above normal and ten percent under a year ago. Conchas Reservoir has 309,000 acre-feet in storage, 44,000 acre-feet under last year. Seasonal precipitation has been above average and soil moisture conditions are good in the Tucumcari project area.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF
PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS
BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

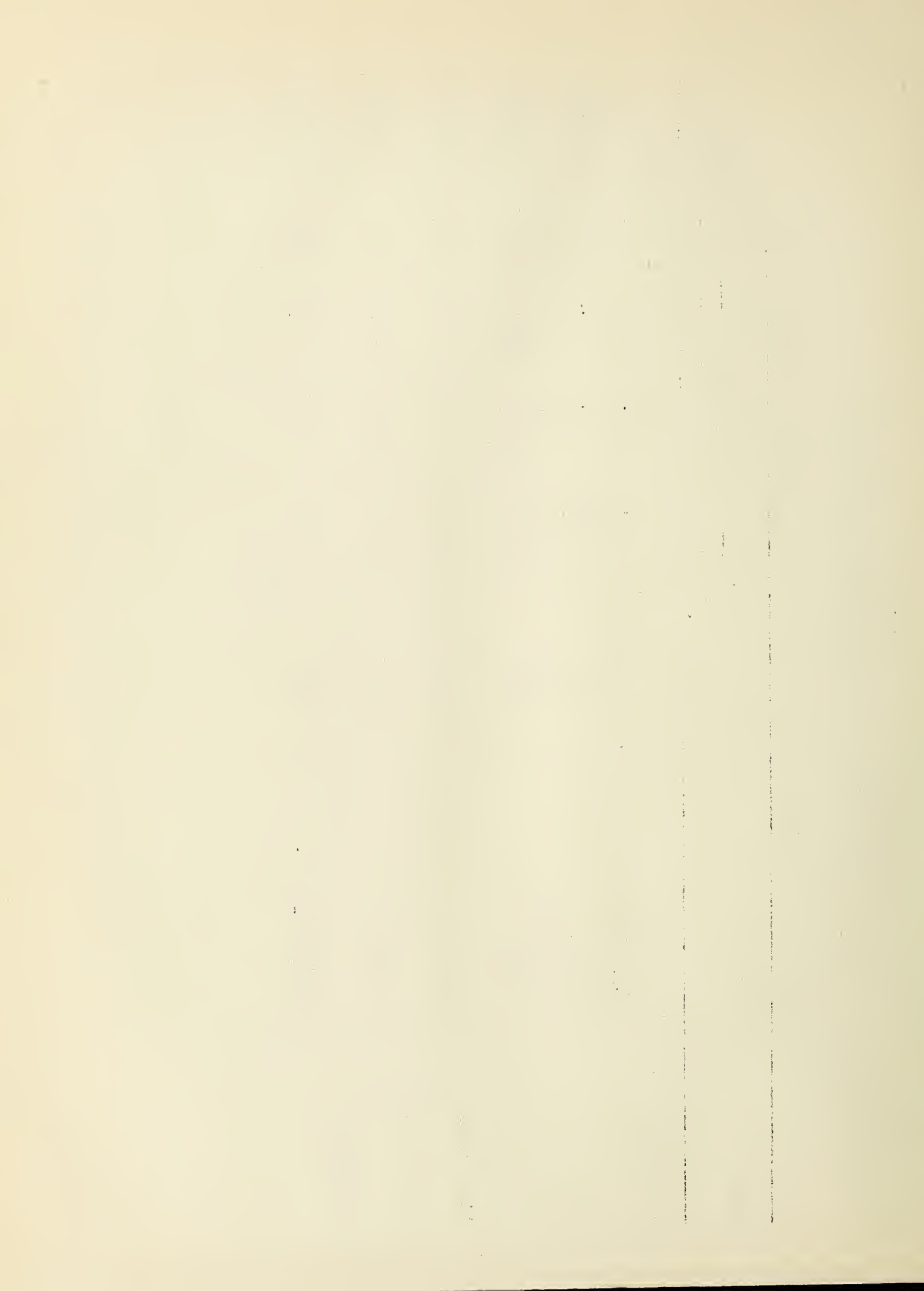
In Percent of Normal
March 1, 1949



SNO^W, SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, MARCH 1, 1949

STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	THOUSANDS OF ACRE FEET IN STORAGE				
			About March 1				10-year Ave. 1938-47
			1949	1948	1947	1946	
RIO GRANDE	Rio Grande	45.8	17.5	22.3	4.8	7.5	14.5
	Santa Maria	45.0	4.9	5.4	4.4	6.7	9.1
	Sanchez	103.0	5.4	8.6	6.1	13.1	15.4
	Terrace	17.7	1.7	5.6	3.2	1.6	3.4
	Continental	26.7	3.2	3.0	1.2	13.1	7.3
	Elephant Butte	2273.7	519.1	416.3	543.7	1070.7	1148.0
CHAMA RIVER	Caballo	365.0	160.2	149.2	288.9	266.3	210.9
	El Vado	226.0	101.0	7.3	30.6	90.4	55.5
CANADIAN RIVER	Conchas	600.0	309.2	353.1	366.8	341.6	268.0
PECOS RIVER	Alamogordo	148.0	30.4	32.4	49.4	29.6	71.1
	McMillan-Avalon	45.0	7.1	8.1	7.2	4.2	14.8



SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

RIO GRANDE BASIN

March 1, 1949

SUMMARY OF MARCH 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth		Water Content		Number Courses in Average	Snow Density		1949 Water Content in percent of	
	Twelve year Avg.*	1948	Twelve year Avg.*	1949		Twelve year Avg.	1948	Twelve Year Avg.*	1948
	In.	In.	In.	In.		Percent	Percent	Percent	
Rio Grande (Colo.)	35.0	46.5	45.2	13.7	9	26	25	149	116
Upper Rio Grande	39.9	63.3	57.8	18.7	3	27	27	173	109
Alamosa River	41.0		58.7	18.7	2	24		187	--
Conejos River	45.6	47.9	53.4	17.0	2	29	22	131	164
Culebra River	35.3	38.7	39.7	9.8	1	26	30	105	86
Rio Grande (N.M.)	26.0	31.8	29.4	8.6	13	28	25	119	108
Chama River	37.9	36.5	44.1	15.0	5	30	25	134	161
Pecos River	18.7	28.2	21.1	5.6	3	26	23	116	88
Canadian River	22.6	30.6	26.9	6.9	4	28	25	109	91

*Some for shorter periods

P R E C I P I T A T I O N D A T A

WATERSHED	STATE	Precipitation		Departure from Normal		Precipitation*		Departure from Normal	
		October 1 to February 28	Inches	from Normal	Inches	February	Inches	from Normal	Inches
Canadian	New Mexico		3.73	+0.19		0.37		-0.37	
Rio Grande	Colorado		3.72	-0.78		0.57		-0.44	
Rio Grande (N)	New Mexico		5.37	+0.24		0.84		-0.24	
Rio Grande (S)	New Mexico		3.13	+0.34		0.45		+0.05	
Pecos	New Mexico		3.84	+0.20		0.50		-0.07	

*January precipitation tentative



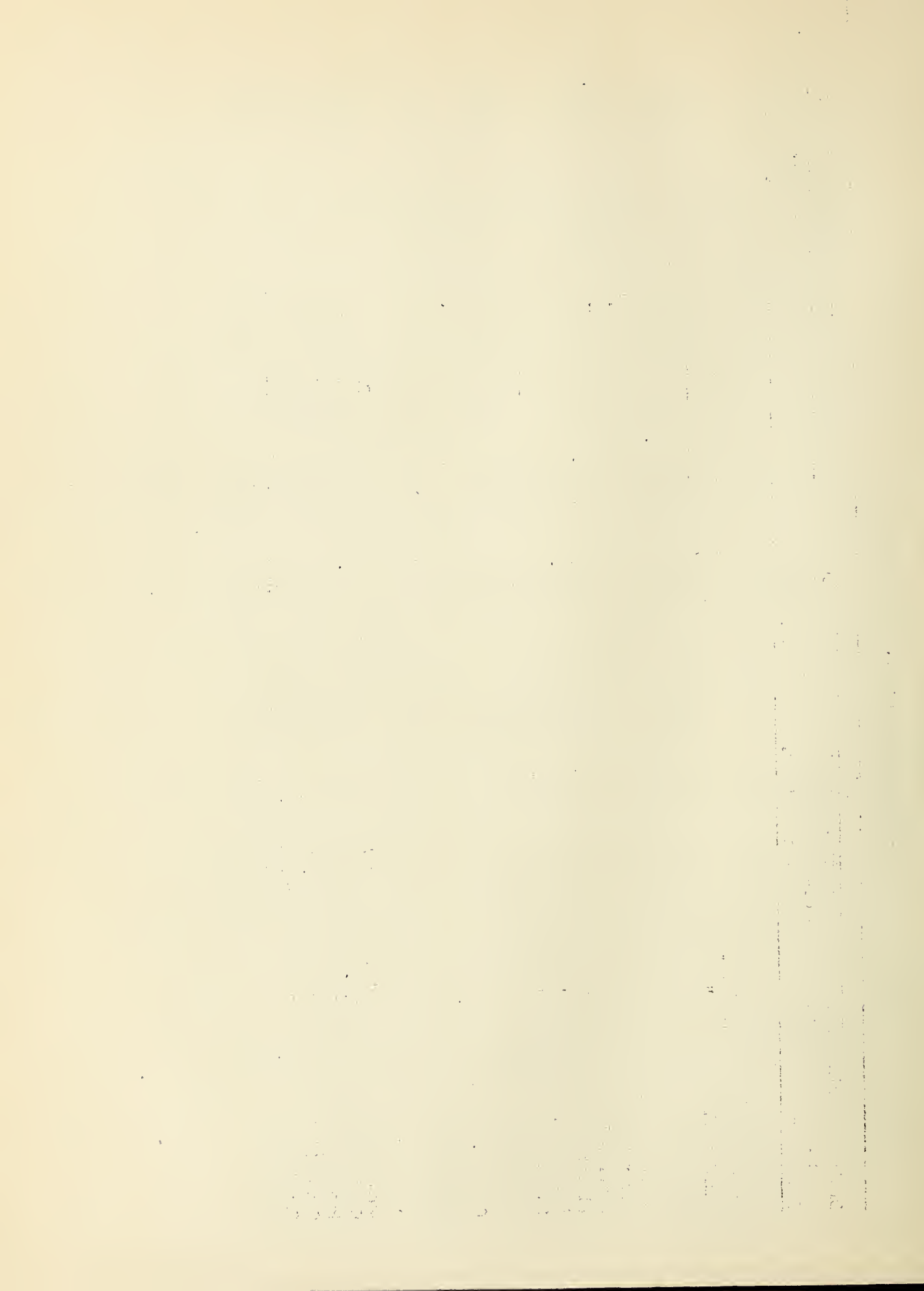
RIO GRANDE DRAINAGE SNOW SURVEYS

March 1, 1949

Drainage Basin and Snow Course	No. and State	Location			Elev.	Date of Survey	Snow Depth (Inches)	Snow Cover Measurements				
		Sec.	Twp.	Range				Water Content (Inches)	1947	1948	Yrs. of Av. Water Content Rec.	Past Record Av. Water Content (Inches)
RIO GRANDE IN COLORADO												
Wolf Creek Pass	26 Colo	4	37N	2E	10000	2/28	102.2	35.4	20.0	27.7	12	22.1
Upper Rio Grande	27 "	13	40N	4W	9350	2/20	40.0	12.5	5.9	16.8	11	6.4
Silver Lakes	47 "	15	36N	5E	9600	2/28	38.8	11.4	5.3	7.1	12	4.8
River Springs	49 "	25	33N	6E	9300	2/28	33.9	4.0	6.7	8.6	12	6.5
LaVeta Pass #2	74 "	22	28S	70W	9300	2/28	32.4	8.6	8.0	10.8	11	7.3
Summitville	76 "	30	37N	4E	11500	3/4	78.6	26.0	16.1	---	9	15.3
Cumbres Pass #2	77 "	17	32N	5E	10000	2/27	73.0	24.9	15.8	12.3	12	19.4
Santa Maria	80 "	8	41N	2W	9700	2/26	31.2	8.3	3.1	6.8	10	3.9
Culebra	82 "		37.2N	105.2W	10000	3/1	39.7	9.8	9.7	11.4	9	9.3
Ft. Garland	84 "	13	29N	72W	8200	2/27	15.6	3.5	1.3	4.7	8	3.3
Stunner Pass	107 "	16	36N	4W	10550							
Platoro	108 "	22	36N	4W	9950	3/6	70.2	22.7				
West Conejos	109 "	25	35N	4E	9450	3/6	42.6	12.9				
La Manga	110 "	24	32N	5E	10100	3/1	77.6	26.2				
Pyramid	122 "	26	41N	5W	10300							
Spr. Creek Pass	123 "	2	42N	3W	10900	2/24	30.9	7.7				
Pool Table Mt.	124 "	19	41N	2E	10000	2/24	41.3	11.2				
Lake Humphreys	125 "	32	40N	1E	9300	2/24	30.1	6.8				
Cochetopa Pass	126 "	12	45N	3E	10000	5/11	45.2	13.7	8.4	11.8		9.2
Average for Drainage												
UPPER RIO GRANDE												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	2/28	102.2	35.4	20.0	27.7	12	22.1
Upper Rio Grande	27 "	13	40N	4W	9350	2/20	40.0	12.5	5.9	16.8	11	6.4
Santa Maria	80 "	8	41N	2E	9700	2/26	31.2	8.3	3.1	6.8	10	3.9
Pyramid	122 "	26	41N	5W	10300							
Spr. Creek Pass	123 "	2	42N	3W	10900	2/24	30.9	7.7				
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March 1, 1949

Drainage basin and Snow Course	Location					Snow Cover Measurements						
	No. and State	Sec. -	Twp. or Lat.	Range or Long.	Elev. -	Date of Survey	Snow Depth (Inches)	Water Content (Inches)			Yrs. of Rec.	Past Record Av. Water Content (Inches)
								1949	1948	1947		
ALAMOSA RIVER Silver Lakes Summitville	47 Colo. 76 "	15 30	36N 37N	5E 4E Average for drainage	9600 11500	2/28 3/4	38.8 78.6 58.7	11.4 26.0 18.7	7.1 — —	5.3 16.1 10.7	12 9	4.8 15.3 10.0
CONEJOS RIVER River Springs Cumbres Pass #2 Platoro West Conejos La Manga	49 Colo. 77 " 108 " 109 " 110 "	25 17 22 25 24	33N 32N 36N 35N 32N	6E 5E 4W 4E 5E Average for drainage	9300 10000 9950 8450 10100	2/28 2/27 3/4 3/4 3/1	33.9 73.0 70.2 42.9 77.6 53.4	9.0 24.9 22.7 12.9 26.2 17.0	8.6 12.3 — — 10.4	6.7 15.8 — — 11.2	12 12	6.5 19.4 — — 13.0
CULEBRA RIVER Culebra	82 Colo.		37.2N	105.2W	10000	3/1	39.7	9.8	11.4	9.7	9	9.3
CHAMA RIVER Cumbres Pass #2 Canjilon Pay Role Chama Divide Chamita	77 Colo. 6 N.M. 15 " 17 " 18 "	17 4 16	32N 26N 28N 36.9N 36.9N	5E 6E 7E 106.7W 106.7W Average for Drainage	10000 9500 9700 7750 8500	2/27 2/28 3/1 3/4 3/4	73.0 36.2 44.5 26.2 40.6 44.1	24.9 13.3 15.4 8.2 13.3 15.0	12.3 10.3 11.3 4.8 7.8 9.3	15.8 19.4 8.8 4.2 8.8 11.4	12 11 8 9 8	19.4 14.0 8.5 5.2 8.9 11.2

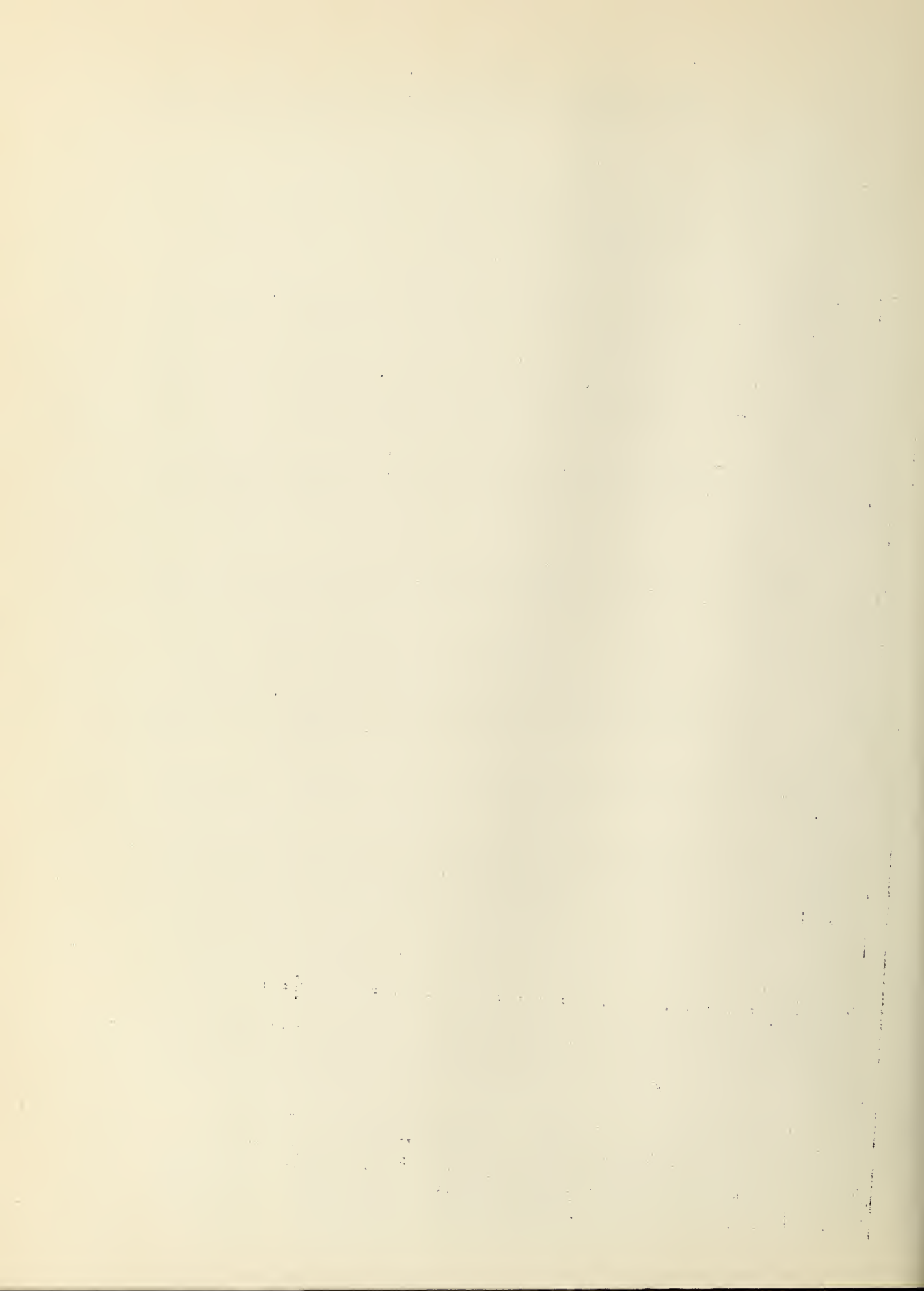


RIO GRANDE DRAINAGE SNOW SURVEYS

March 1, 1949

Drainage Basin and Snow Course	No. and State	Location				Snow Cover Measurements										
		Sec.	Twp. or Lat.	Range or Long.	Elev. of Survey	Date of Survey	Snow depth (inches)	Water Content (Inches)			Years or Rec.	Past Record Av. Water Content (Inches)				
								1949-	1948	1947						
				RIO GRANDE IN NEW MEXICO												
Red River	1 N.M.	29	28N	15E	9500		27.8	8.0	7.7	6.0	12	8.0				
Taos Canyon	2 "	10	25N	15E	9000		11.9	3.4	6.8	6.0	12	6.1				
Aspen Grove	4 "	12	18N	10E	9100	3/1	16.7	4.5	6.1	2.1	12	4.9				
Lee Ranch	5 "	3	18N	4E	9050	3/1	36.3	9.0	10.5	4.8	12	7.1				
Canjilon	6 "	4	26N	6E	9500		36.2	13.3	10.3	19.4	11	14.0				
Hematite Park*	9 "	8	28N	15E	9500		20.7	5.2	6.7	4.1	12	5.5				
Tres Ritos	12 "	23	22N	13E	9000	3/1	27.2	6.0	7.4	5.7	11	6.2				
Pay Role	15 "	16	28N	7E	9700		44.5	15.4	11.3	8.8	8	8.5				
Chama Divide	17 "		36.9N	106.7W	7750	3/4	26.2	8.2	4.8	4.2	9	5.2				
Chamita	18 "		36.9N	106.7W	8500	3/4	40.6	13.3	7.8	8.8	8	8.9				
Cordova	19 "	22	22N	13E	10100	2/28	47.2	13.1	9.7	8.0	7	9.6				
Panchuela #2	20 "	27	19N	12E	8300	2/28	19.8	4.6	5.0	1.6	12	3.7				
Big Tesuque	21 "	17	18N	11E	10000	3/1	26.7	7.6	8.2	2.8	7	5.9				
Elk Cabin	24 "	8	18N	11E	8250	3/1	19.0	5.2	6.6	---	1	6.6				
			Average for drainage				29.4	8.5	7.9	6.3		7.2				
PECOS RIVER																
Aspen Grove*	4 N.M.	12	18N	10E	9100	3/1	16.7	4.5	6.1	2.1	12	4.9				
Panchuela #2	20 "	27	19N	12E	8300	2/28	19.8	4.6	5.0	1.6	12	3.7				
Big Tesuque"	21 "	17	18N	11E	10000	3/1	26.7	7.6	8.2	2.8	7	5.9				
Gallinas	25 "	31	18N	14E	8700	2/27	16.8	5.4	3.6	---	1	3.6				
			Average for drainage				21.1	5.6	6.4	2.2		4.8				
					CANADIAN RIVER											
Hematite Park	9 N.M.	8	28N	15E	9500		20.7	5.2	6.7	4.1	12	5.5				
Ocate Mesa	10 "	25	24N	16E	9200		12.4	3.3	6.4	4.6	11	4.0				
Tres Ritos*	12 "	23	22N	13E	9000	3/1	27.2	6.0	7.4	5.7	11	6.2				
Cordova*	19 "	22	22N	13E	10100	2/28	47.2	13.1	9.7	8.0	7	9.6				
			Average for drainage				26.9	6.9	7.6	5.6		6.3				

*On adjacent drainage



The following organizations cooperate in the water surveys and irrigation water supply programs for the Colorado, Missouri-Arkansas and Rio Grande valleys by furnishing funds or services:

STATES

Colorado State Engineer
Wyoming State Engineer
Utah State Engineer
New Mexico State Engineer
Arkansas State Engineer
Missouri State Engineer
Colorado Department of Reclamation
Colorado Irrigation Service
Arkansas Experiment Station
Utah Department of Reclamation

FEDERAL

Department of Agriculture
Forest Service
Soil Conservation Service
Department of Interior
Bureau of Reclamation
Geological Survey
National Park Service
Department of Commerce
Bureau of Reclamation
War Department
Army Engineer Corps

LOCAL COMPANIES

Defiance Public Service Company
Arkansas Valley Power Company
Arkansas Power Company
Public Service Company of New Mexico
Denver and Rio Grande Western Railroad Company

MUNICIPALITIES

City of Denver
City of Aurora
City of Boulder

WATER USERS ASSOCIATIONS

Arkansas Valley Water Users' Association
Arkansas Valley Water Association
Colorado River Water Conservation District

WATER USER SOCIETIES

Arkansas Reclamation and Irrigation Company
Arkansas Valley Irrigation District
Santa Maria Reclamation Company
Centennial Land Company
Cimarron Valley Water Users' Association
Wyoming Development Company
Arkansas Irrigation District
Arkansas Valley
Arkansas Valley Irrigation District
Arkansas Valley Water Users' Association
Arkansas Valley Irrigation and Reclamation District
Arkansas Reclamation and Irrigation Company

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